



NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

**THE EFFECTS OF MINORITY COMMAND LEADERSHIP
ON RETENTION OF MINORITY JUNIOR OFFICERS**

by

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March 2019

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OF MINORITY JUNIOR OFFICERS**

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requirements for the degree of

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ABSTRACT

This thesis examines how Minority Commanding Officers and Minority Senior Leadership (O4–O6) affect the retention of Junior Officers who are the same minority. The initial hypothesis for this thesis was that there would not be a statistically significant effect between minority demographics and retention of Junior Naval Officers. To measure the role model effect between minority leadership and retention, two models were utilized. These two models yielded 21 different results for the three main minority demographics of African American, Female, and Hispanic and their respective role model retention effects. Of these 21 results, only one, the role model effect for African American Junior Officer serving under an average percentage of African American Senior Leadership, was statistically significant. A one percentage point increase in the percentage of African American Senior Leadership yielded a 0.007 decrease in the likelihood of retention. This result runs counter to the findings of previous studies. Future research is recommended. Policy revisions affecting accessions, promotions, and leadership selection based solely on minority demographics should be placed on hold until further research is conducted.

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—Snoop Dogg

(Hollywood Boulevard Walk of Fame Star acceptance speech, 2018)

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I. INTRODUCTION

A. PURPOSE

This thesis examines Minority Naval Command Leadership, specifically Commanding Officers, and the effects they have on the retention of Minority Junior Naval Officers. Using empirical data from Fiscal Years 1995–2018, it compares the retention rates for Minority Junior Naval Officers based on different levels of exposure to Minority Naval Command Leadership. This thesis tests the hypothesis of whether or not there is a difference in the retention based on Minority Leadership having an influence on Minority Junior Officers, as well as providing predictive qualities within these demographics that indicate the success and/or failure of Minority leadership accession.

This topic is important for military personnel planning as well as the establishment and implementation of various personnel policies. Over the past decades, significant movement has been made regarding the ascension of Minority Senior Officers taking command and that these demographic numbers were not reflecting that of society. This study examines the effects of diverse leadership on the retention of Minority Junior Officers. We will test to see if evidence exists of increased retention for Minority Junior Officers who have served under Minority Commanding Officers. Additionally, we will test if any evidence exists of increased retention for Minority Junior Officers who have served under a higher percentage of Minority Senior Officers, specifically the ranks of Lieutenant Commander (O4), Commander (O5), and Captain (O6). The results of these tests will either aid the Navy in potentially revising policies that encourage the ascension of Minorities to the Commanding Officer billets or, on the contrary, provide evidence for current policies to remain unchanged. The test is whether Minority Senior Officers have an effect on the retention of Minority Junior Officers.

B. BACKGROUND

In January 2017, the Department of the Navy (DON) released its Diversity and Inclusion Roadmap. This roadmap was specifically designed with harnessing “diversity as a force multiplier and to foster a culture of inclusion” (Navy Office of Information [NOI],

2017). Victoria Bowens, then Director of Diversity and Inclusion Management for the Department of the Navy, stated that:

In an organization like ours—so reliant on our people—creating a diverse and inclusive community isn’t only the right thing to do, it’s critical to the successful implementation of our readiness mission. (NOI, 2017)

This roadmap was split into three strategic imperatives. “The first strategic imperative is a promise to recruit and access from a diverse group of applicants to secure a high-performing, innovative workforce that reflects all segments of society” (NOI, 2017). “The second is a promise to cultivate an inclusive culture that accelerates opportunities to empower each individual’s maximum impact, encourages innovation and collaboration, enhances developmental opportunities, and retains the best talent to enable uniformed and civilian personnel to contribute to their full potential” (NOI, 2017). “The third imperative promises to develop strategies to equip leaders with the ability to effectively manage diversity, be accountable, measure results, and refine approaches to engender a sustainable culture of inclusion” (NOI, 2017). The importance of this cannot be overstated, as Bowens went on to say:

As we embark upon the uncertain and ambiguous security challenges for tomorrow, she added, our global readiness priorities rests upon our ability to lead and manage a multi-generational, multi-cultural workforce. (NOI, 2017)

With the goal of addressing the underrepresented demographics clearly addressed, it is important to identify the disparity that exists in the United States Navy. According to the December 31, 2017, snapshot from Navy Personnel Command of the 54,267 Active Duty Officers, 42,352 of them are white; this equates to 78 percent of the force (Navy Personnel Command [NPC], 2017). In comparison, 479 or .5 percent are American Indian, 2783 or .9 percent are Asian, 4,239 or 5.1 percent are African American, and 1,979 or 3.7 percent are Hawaiian or Pacific Islander (NPC, 2017). The disparity in gender also is staggering, with only 10,015 or 18.4 percent identifying as female in comparison to their male counterparts numbering 44,252 or 81.6 percent (NPC, 2017). The Department of the Navy must close these gaps if it hopes to leverage an untapped talent pool that better reflects the demographics of the country.

C. RESEARCH QUESTIONS

The primary questions of this study are focused on the retention levels of Minority Junior Officers serving under the command of Minority Commanding Officers in the Navy Surface Fleet.

1. Do Minority Commanding Officers have an effect on the retention of Minority Junior Officers in the Navy?
2. Do Minority Senior Officers have an effect on the retention of Minority Junior Officers in the Navy?

D. SCOPE AND METHODOLOGY

While this study analyzes overall historical data regarding retention, it also provides descriptive data focused on identifying a detailed analysis of Officers who entered and have served in the Navy Surface Fleet between 1995 and 2018. The scope of this thesis includes a qualitative review about diversity in the military as well as the effects of same-race, same-ethnicity and same-gender role models while leveraging a link to what the data set exhibits. These principles will be reviewed to see if they apply to the retention of minority Junior Officers who have served under a minority Commanding Officer.

The thesis concludes with recommendations directed to the current efforts of the United States Navy regarding the retention and recruitment of minority Officers. To determine historical first-term retention rates of these minority Officers, data was obtained from the Defense Manpower Data Center (DMDC). The data covered all Officers who entered the Navy's Surface Fleet from 1995 through 2018 and included gender, educational background, age at time of commissioning, race, ethnicity, source of commissioning, rank at time of the data pull, and end of active obligated service time. The majority of first term Officers must make their decision to stay by the 7.5-year mark. This becomes the baseline methodology used for whether or not the minority Junior Officer retained in the United States Navy.

E. ORGANIZATION

The thesis consists of five chapters. Chapter I contains an introduction and brief information pertaining to the retention of the minority Officers serving in the United States Navy. Chapter II encompasses a literature review of previous same-race, same-ethnicity, and same-gender studies and the effects this has on a subordinate striving to be like their same-gender role model; this framework will provide the cornerstone of this thesis. Chapter III entails an analysis of the data with summary statistics as well as an explanation of the variables that are discussed in the analysis. Chapter IV provides an explanation of the methodology results as well as a presentation of the findings from the Ordinary Least Squares (OLS) regression analysis to predict the effects of minority Commanding Officers on the retention of the minority Junior Officers who have served or are currently serving under their command. Chapter V completes the thesis with a summary, conclusion, and recommendations based on the findings, and finally, considers future opportunities for further research pertaining to the topic.

II. LITERATURE REVIEW

A. INTRODUCTION

Wage gaps have undoubtedly decreased over the past few decades for women and minorities in the entirety of the job market but also specifically within the science and engineering segments. With demographic trends such as affirmative action encouraging minorities to attend college, specifically for degrees in science and mathematics, both the job market and the Navy are seeing an upward trend in minority recruitment and demographic representation that will surely continue. A conscious effort has been made within the Navy to ensure that all minorities are operating on an equal footing and that due to this equality, eventually the Navy will see the effect of role models on its Junior Officers. The following pieces of literature discuss how role model effect can be measured and how they can be used to benefit an organization.

This thesis observes how the Surface Warfare community in the United States Navy can potentially leverage any role model effects that could exist within the community. If a role model effect does exist within the community, we then can proceed with identifying any potential changes to policy that can take advantage of this effect while simultaneously shifting the demographics of the Navy to better represent the demographics represented in the civilian population.

B. DEMOGRAPHIC DIVERSITY AND MILITARY FORCE DRAWDOWNS

In 2015, Maria C. Lytell et al. published a study with the RAND Corporation regarding the plans for an extensive reduction or drawdown in the military. In early 2012, the Department of Defense announced its plans for another drawdown. The study examines the effect on all four branches of the military following the conclusion of the Cold War, from 1987 to 2000, when the military saw a force reduction from 2.17 million to 1.37 million service members. To avoid and address any unintended consequences of a force drawdown to the demographic diversity of the force, the Office of Diversity Management and Equal Opportunity (ODMEO) that exists within the Office of the Under

Secretary of Defense (Personnel and Readiness), tasked Lytell et al. and the RAND Corporation to focus specifically on gender, race, and ethnicity.

In the study, the major findings stem from the premise that previous active duty reductions did not affect the demographic diversity of the force. In fact, despite the reduction in size in the 1990s, the demographic diversity actually increased (Lytell et al., 2015). This extended to the Navy and Air Force, which decreased their forces in the mid-2000s but also saw an increase in demographic diversity between the years of 2001 and 2011 (Lytell et al., 2015). The importance of this is that reduction decisions do not have a clear correlation to demographic diversity, because the decisions of who and who not to cut are not based on demographic goals. It is unclear, however, how drawdowns affect demographic diversity when the three categories of workforce characteristics are used for a reduction. The three workforce characteristics utilized to categorize active duty personnel in a reduction are experience, occupational specialty, and merit (Lytell et al., 2015). This effect is unclear and could end up hurting demographic diversity because of the uneven distribution of demographics across the three workforce characteristic categories. Furthermore, the unclear effects of a drawdown on demographic diversity could extend to nontactical military occupations that could have negative effects on women and African Americans (Lytell et al., 2015). Hispanic men could be affected from a demographic diversity standpoint if cuts arrive to tactical occupations. In terms of service length, drawdowns cutting long service tenure members could negatively affect African American personnel, while cuts to short service tenure members could negatively affect women. Finally, the results from the study showed that drawdowns focused on more stringent accession standards (physical fitness standards, more technical degrees, etc.) could have negative effects on both women and minorities (Lytell et al., 2015).

C. SAME RACE, ETHNICITY, AND GENDER EFFECTS IN THE CLASSROOM

In 2005, Thomas S. Dee published a study in *The American Economic Review* that focused on the large achievement gaps stemming from education in the United States. He focused primarily on the social inequality for minority students resulting in lack of educational attainment and earnings. Identifying this problem, his study investigates

whether being assigned to demographically similar teacher has an effect on the teacher's subjective assessments of the student's behavior and performance. His analysis was largely derived from a national survey conducted by the National Education Longitudinal Study of 1988 (Dee, 2005). Dee clearly states that most relevant literature focuses on how being paired by race, ethnicity, and gender influence a teacher's perceptions, expectations, and performance of students. He then notes that the teacher's perception clearly influences a particular student and their access to further opportunities in education, resulting in a specific learning environment. This specific learning environment directly correlates to that student's future productive ceiling.

Dee concluded from his results that the dynamic existing between race, ethnical classification, and gender between students and their teachers demonstrates large effects on the student's performance as well as the teacher's perception of those performances (Dee, 2005). Dee goes on to further conclude that the results are primarily among students with low socioeconomic status, implying that the classroom interactions between teacher and student in these demographics are of larger significance (Dee, 2005). His results state that the most significant and recommended policy to reduce the gap is to focus on recruiting teachers who are largely underrepresented. There are distinct pro and con aspects of this policy if it were to be implemented. The positive of this policy implementation is that those implementing it do not require a clear understanding of the effects within Dee's results as their passive effects are derived from teacher-student behaviors (Dee, 2005). However, the negative of such a recruiting policy would be that it could have unintended or undesirable consequences for those students who do not share the same demographics as the teachers chosen (Dee, 2005). Dee finishes by stating that further research illustrating the nature of teacher-student relationships is necessary, that the sweeping policy that he recommended is not the answer, and that an alternative policy such as student-focused programs emphasizing the bonds of demographic ties may be the solution (Dee, 2005).

D. SAME GENDER AND RACE ROLE MODEL EFFECTS

In 2016, Michael S. Kofoed and Elizabeth McGovney published a study in *The Journal of Human Resources* focusing on the random assignment of role models to cadets

enrolled at the United States Military Academy at West Point. This study examines the effect of same gender or race mentors on the occupation or military occupational specialty selected by the students. The theme of this study was to explore women and racial minorities who are historically underrepresented in specific occupations within the Army. The theory behind their work was that one possible explanation to the gender and racial disparities that exist in the operational branches within the Army is a lack of female and minority mentors. Citing this lack of mentorship as the root cause, they go on to state the belief that these individuals are underrepresented within these fields due to the individuals feeling uncomfortable, or that they possess a lower status when compared to their peers, when selecting those specific military occupations (Kofoed & McGovney, 2017). To study this, the two called on data from the Office of Economic and Manpower Analysis (OEMA). This access to data was easily obtainable due to OEMA being housed at the United States Military Academy at West Point. The specific data set they used contained the ranked branch preferences from each of 6,254 cadets who graduated between the years of 2010 and 2015. Within the data, initial company, graduation company, gender, ethnicity, SAT Scores, fitness scores, leadership scores, academic GPA, and status as a NCAA athlete were contained. The data was stripped of all potential individual identifiers prior to access being gained. After gaining access, the two used conditional random assignment of cadets to tactical officers at the United States Military Academy at West Point. Kofoed and McGovney then sorted the cadets into companies assigned to a company tactical officer who served in a supervisory role and as a role model to the company. From here, the initial job preferences, which were submitted at the beginning of the year, were compared to job preferences at the end of the year.

The results overwhelmingly support the effect of the tactical officer in the role model function. Female cadets working under the supervision of a female tactical officer were 5.9 percentage points more likely to choose the military occupation of their assigned tactical officer as their first choice and 18.1 percentage points more likely to choose the military occupation of their assigned tactical officer in their top three choices (Kofoed & McGovney, 2017). The results were similar for African American cadets serving under an African American tactical officer. African American cadets were 3.3 percentage points

more likely to list the military occupation of their assigned tactical officer as one of their top three preferences (Kofoed & McGovney, 2017). The role model effect did not extend to Hispanics, however, as Hispanic cadets were 0.6 percentage points less likely to choose the military occupation of their assigned tactical officer as their top choice (Kofoed & McGovney, 2017).

The issue that Kofoed and McGovney focus on at the end of their study is the underrepresentation of woman and minorities in the Army, specifically in the military occupations that are classified as combat arms. They cite the growing concern with this issue based on all military occupations being available for women starting in 2016 (Kofoed & McGovney, 2017). With a lack of role models in these jobs, both the ascension of women within the ranks and the recruitment of women to key jobs such as infantry officers and armor officers will continue to be difficult and underrepresented (Kofoed & McGovney, 2017).

E. SUMMARY AND HOW THIS THESIS DIFFERS

This thesis observes only Naval Officers in the Surface Warfare community. The Officers in this specific Defense Manpower Data Center data set will have the designator 1110 (Qualified Surface Warfare Officer), 1115 (Qualified Reserve Surface Warfare Officer), 1165 (Qualified Reserve Surface Warfare Officer—Nuclear), or 1160 (Officer in training for Surface Warfare Officer qualification). After identifying who the Commanding Officer is at each Naval Warship, they will then be linked to the subordinate Naval Officers serving under them using the warship's Unit Identification Code. After this link is identified, the retention of these subordinate Naval Officers will be dissected based on whether or not they extended past the 7.5-year mark. This mark in time is the deadline for Surface Warfare Officers to extend their time in the Navy or to resign their commission, ultimately ending their time in the Active Duty Navy.

The main difference between this thesis and the past studies explained in the above literature review is that this thesis will apply the evidence of role model effects to the United States Navy's Surface Fleet to see if this effect does exist and then to determine how the Navy can best move forward to fully diversify its Navy. The RAND Corporation

study by Maria C. Lytell et al. is important with regard to the effects of policy changes. Of note, there will always be desired and undesired effects of policy change. The policy changes that will be presented and recommended at the end of this thesis will attempt to account for these.

A true representation of the population's demographics is the key to unlocking the potential of these stellar Naval Officers with hopes of ensuring the continued prosperity of the United States of America through the advancement of the United States Navy; the Department of the Navy and the Office of Diversity and Inclusion have made this their goal.

III. DATA AND VARIABLE DESCRIPTION

A. DATA

The data utilized for this analysis was provided by the Defense Manpower Data Center (DMDC) from the Officer Personnel Database. The data contains all Officers in the Surface Warfare community including conventional and nuclear designations from the years of 1995 through 2018. Furthermore, the data covers only those Naval Officers serving on cruisers and destroyers. Until 1979, women were not allowed to serve on ships and therefore were not contained in the Surface Warfare community until then. Women were not allowed in the Nuclear Surface Warfare community until 1994, when Mary R. Henson enrolled as the first female candidate in nuclear power school. Finally, it was not until 1998 that CDR Maureen A. Farren took command of an amphibious dock landing ship, USS *Mount Vernon* (LSD-39), becoming the first woman to command a warship in the United States Navy. Since the data set studies women who started their Naval service before 1979 and were in command during the analysis period, it will be slightly skewed. It is also important to note that all Personally Identifiable Information (PII) such as names, birth dates, home of record, or social security numbers has been removed from the data set.

Two main constraints were observed when sifting through the data set. The first constraint is that, though requested, the Additional Qualification Designator (AQD) was not provided for each observation. These AQDs are essential to identifying extra jobs or designations that a Naval Officer has achieved. Examples of these AQDs include but are not limited to Legal Officer, Tactical Action Officer, or Commanding Officer at Sea. These requested AQD identifying the Commanding Officer at Sea were not available from DMDC; therefore, this restricts our certainty of accuracy for identifying the Commanding Officer needed for the testing in the model. The absence of this code, however, does not limit our ability to identify the Commanding Officer at Sea for each United States Navy Warship through other means. To identify the Commanding Officer on each warship, we identified the highest-ranking Officer on the ship at any given time. If there were multiple Officers with the same highest rank on the ship, the Officer who has been on board the longest was identified to be that of the Commanding Officer. The reasoning behind the

utilization of time on board accounts for Commanding Officers who previously served as the ship's Executive Officer on board but then fleeted-up to the Commanding Officer while sharing the same highest rank of the new Executive Officer on board. The second constraint that was accounted for is the Loss Code in the DMDC data set that identifies the reason an Officer left the military. Our model does not focus on those Naval Officers who were forced to leave the Navy due to misconduct or poor performance. Instead, these Officers are kept in the data set to account for the unquantifiable leadership effects that could potentially exist between a Senior Officer and his or her subordinate of the same demographical category. Our data set includes all Officers who left due to unsatisfactory conduct, unacceptable conduct, administrative separation, court martial, or involuntary discharge as well as all of those Naval Officers who chose to leave the Navy through the completion of their required active service. In total, this is a very miniscule portion of the data set and should not provide any hinderance to our model. However, if it were to have an effect on the model, it would cause the results to trend negatively due to the decrease in retention.

The data is then used to analyze the primary question: does minority Senior Leadership have an effect on the retention of minority Junior Officers in the Navy? In order to analyze this question, each data point was thoroughly sifted to identify which minority Junior Officers served under a minority Commanding Officer for at least 6 months, or served under minority Senior Leadership, and how many of these Junior Officers remained in service after their initial contract was completed. To do this, following the typical career path of a Surface Warfare Officer, a decision to stay or to conclude your service must be made prior to the 7.5-year mark in career service. We used this point in time as an action point to identify minority Junior Officers who have served under minority Commanding Officers and extended their End of Active Obligated Service (EAOS) past the 7.5-year mark.

B. VARIABLE DESCRIPTION

The variables chosen for this study mirror previous studies done at the Naval Postgraduate School on Officer retention in the United States Navy. Due to a lack of data input over the decades, many fields in the observations were omitted by DMDC. These

variables should be incorporated in future research on this topic. This and other future research topics can be found in Chapter V.

1. Dependent Variable

Based on the average Surface Warfare Officer's career path, the completion of sea and shore duties should culminate at the 7.5-year mark in their career. In the Surface Warfare community, at this point, an Officer should have successfully completed his or her Division Officer tours as well as their shore duty. The next career step for these Naval Officers will be the selection of and attendance in Department Head School in Newport, Rhode Island. With this in mind, the dependent variable in our model is the extension of an observation's EAOS past the 7.5-year mark, which encapsulates the retention of the Junior Officer.

2. Explanatory Variables

The following comprises a list of potential explanatory variables that were gathered by and received from DMDC. Not all of these variables will be used in the final model because they could potentially skew the role model effect of a minority Junior Officer serving under minority Senior Leadership:

- Year/Month
- ADBD
- Race
- Ethnicity
- Gender
- EAOS
- Rank
- UIC

From these DMDC variables, we were able to create the following variables:

- African American

- Female
- Hispanic
- Top Rank
- African American Leadership
- Female Leadership
- Hispanic Leadership
- Average Percentage Under a Commanding Officer (African American)
- Average Percentage Under a Commanding Officer (Female)
- Average Percentage Under a Commanding Officer (Hispanic)
- Average Percentage of Senior Leadership (O4-O6) (African American)
- Average Percentage of Senior Leadership (O4-O6) (Female)
- Average Percentage of Senior Leadership (O4-O6) (Hispanic)

a. Year/Month

Data was drawn from 1995–2018. Over the course of this period, snapshots are taken in three-month increments identifying the status of the particular observation. From this data, we observed how many months a particular Junior Officer served under a particular Commanding Officer onboard a particular warship.

b. ADBD

This value is the Active Duty Base Date otherwise known as the date on which service members begin their service. This date is compared to the End of Active Obligated Service (EAOS) to identify Naval Officers who have extended past the 7.5-year mark.

c. Race

With the majority of Officers being Caucasian, the Officers are separated by the race code drawn from the Navy MILPERSMAN 1000–90. The value within is decoded using the manual to identify the race claimed by the Naval Officer. This value is used to identify African American and Hispanic Naval Officers.

d. Ethnicity

With the majority of Officers being Caucasian, the Officers are separated by the ethnicity code drawn from the Navy MILPERSMAN 1000–90. The value within is decoded using the manual to identify the ethnicity claimed by the Naval Officer. This value is used to identify African American and Hispanic Naval Officers.

e. Gender

This value describes whether or not the Naval Officer identifies as a male or as a female. This is utilized to identify the females in the data set provided by DMDC.

f. EAOS

This value is the End of Active Obligated Service. This date is the time at which the initial service requirement is completed for the particular Naval Officer. This value is crucial for our model. A shift in this date to the right introduces the conception that the Naval Officer has chosen to continue his or her career.

g. Rank

This value encapsulates the rank each Naval Officer during each three-month snapshot. The value was destringed to utilize the last digit of the three-digit code to determine the actual rank of the Naval Officer. This is utilized multiple times throughout the formulation and execution of the model, primarily in determining who the Commanding Officer is on each warship as well as the rank of those Junior Naval Officers serving under his or her command.

h. UIC

This value is the Unit Identification Code utilized by all military commands. This number prefixed in this case with an “N” signifies that the following numbers in the code are a Naval command. An example of this is the code “N22143,” which is the UIC given to the *USS Chinook* (PC-9). Each command, to include warships, has its own unique UIC. This code is utilized throughout our model to identify who served as the Commanding

Officer of a United States Warship while linking that person to the Junior Naval Officers who also served on that warship at the same time.

i. African American

With the vast majority of Officers being Male Caucasian, the Officers are separated into three distinct minority groups for analysis purposes: African American, Female, and Hispanic. According to Navy MILPERSMAN 1000–90, the following codes in race or ethnicity indicate that the servicemember identifies as an African American: “N,” “003,” “101,” “102,” “103,” “104,” “108,” “109,” “110,” “111,” “115,” “116,” “117,” “118,” “122,” “123,” and “124.”

The full description of this variable and the following variables can be found in Table 1.

j. Female

With the majority of Officers being Male, the Officers are separated by gender for analysis purposes: Male and Female. According to Navy MILPERSMAN 1000–90, the following codes in gender indicate that the servicemember identifies as a Female “F.”

k. Hispanic

With the majority of Officers being Male, the Officers are separated into three distinct minority groups for analysis purposes: African American, Female, and Hispanic. According to Navy MILPERSMAN 1000–90, the following codes in race or ethnicity indicate that the servicemember identifies as a Hispanic: “E,” “AK,” “AL,” “AM,” “AN,” and “AO.”

l. Top Rank

Without the data set providing the NOBC or AQD signaling that a specific Officer was on board a specific ship filling the billet of Commanding Officer, one of the assumptions made, was that the Officer with the highest rank, would be the Commanding Officer. If there were multiple Officers on board with that same top rank, the Officer who was on board the longest was given the designation in our model as the Commanding

Officer. This specific assumption, accounts for the Surface Fleet Commanding Officer Fleet Up Model where after serving as the Executive Officer, the Officer would then become the Commanding Officer on that same warship.

m. African American Leadership

From the variables of Top Rank and African American, we then created the African American Leadership variable signifying that the Commanding Officer at a given UIC is African American.

n. Female Leadership

From the variables of Top Rank and Female, we then created the Female Leadership variable signifying that the Commanding Officer at a given UIC is a Female.

o. Hispanic Leadership

From the variables of Top Rank and Hispanic, we then created the Hispanic Leadership variable signifying that the Commanding Officer at a given UIC is Hispanic.

p. Average Percentage Under a Commanding Officer (African American)

This variable is constructed to measure the percentage of time a Junior Naval Officer has spent during his or her tour under the command of an African American Commanding Officer at a specific UIC.

q. Average Percentage Under a Commanding Officer (Female)

This variable is constructed to measure the percentage of time a Junior Naval Officer has spent during his or her tour under the command of a Female Commanding Officer at a specific UIC.

r. Average Percentage Under a Commanding Officer (Hispanic)

This variable is constructed to measure the percentage of time a Junior Naval Officer has spent during his or her tour under the command of a Hispanic Commanding Officer at a specific UIC.

s. Average Percentage of Senior Leadership (O4-O6) (African American)

This variable is constructed to measure the percentage of Senior Leadership that is African American that a Junior Naval Officer has spent during his or her tour under the guidance of. Senior leadership is measured as the ranks of Lieutenant Commander (O4), Commander (O5), and Captain (O6) at a specific UIC.

t. Average Percentage of Senior Leadership (O4-O6) (Female)

This variable is constructed to measure the percentage of Senior Leadership that is Female that a Junior Naval Officer has spent during his or her tour under the guidance of. Senior leadership is measured as the ranks of Lieutenant Commander (O4), Commander (O5), and Captain (O6) at a specific UIC.

u. Average Percentage of Senior Leadership (O4-O6) (Hispanic)

This variable is constructed to measure the percentage of Senior Leadership that is Hispanic that a Junior Naval Officer has spent during his or her tour under the guidance of. Senior leadership is measured as the ranks of Lieutenant Commander (O4), Commander (O5), and Captain (O6) at a specific UIC.

A summary of statistics for the aforementioned variables can be found in Table 2.

Table 1. Definition of Variables

Variable Label	Range
African American	Dummy variable for whether the Officer is African American based on the race/ethnicity codes
Female	Dummy variable for whether the Officer is Female based on the gender code
Hispanic	Dummy variable for whether the Officer is Hispanic based on the race/ethnicity codes
Top Rank	Dummy variable for whether the Officer is the Commanding Officer on board a specific United States Warship at the time of the year/month snapshot
African American Commanding Officer	Dummy variable for whether the Officer is the Commanding Officer on board a specific United States Warship at the time of the year/month snapshot is African American based on the race/ethnicity codes
Female Commanding Officer	Dummy variable for whether the Officer is the Commanding Officer on board a specific United States Warship at the time of the year/month snapshot is a Female based on the gender code
Hispanic Commanding Officer	Dummy variable for whether the Officer is the Commanding Officer on board a specific United States Warship at the time of the year/month snapshot is a Hispanic based on the race/ethnicity codes
Average Percentage Under a Commanding Officer (African American)	Dummy variable for the percentage of time a Junior Naval Officer spent under the command of an African American Commanding Officer at a specific UIC
Average Percentage Under a Commanding Officer (Female)	Dummy variable for the percentage of time a Junior Naval Officer spent under the command of a Female Commanding Officer at a specific UIC
Average Percentage Under a Commanding Officer (Hispanic)	Dummy variable for the percentage of time a Junior Naval Officer spent under the command of a Hispanic Commanding Officer at a specific UIC
Average Percentage of Senior Leadership (African American)	Dummy variable for the percentage of African American Senior Leadership (O4-O6) at a specific UIC during a Junior Naval Officer's tour.
Average Percentage of Senior Leadership (Female)	Dummy variable for the percentage of Female Senior Leadership (O4-O6) at a specific UIC during a Junior Naval Officer's tour.
Average Percentage of Senior Leadership (Hispanic)	Dummy variable for the percentage of Hispanic Senior Leadership (O4-O6) at a specific UIC during a Junior Naval Officer's tour.

Table 2. Summary Statistics

Summary Statistics		Total Sample N=2360		African N=231		Hispanic N=169		Female Sample N=590	
Variable		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Retention		0.154	0.361	0.099	0.300	0.148	0.356	0.127	0.333
AVG % African American (AA) Commanding Officer		6.205	17.548	8.307	20.658				
AVG % Hispanic (Hisp) Commanding Officer		5.195	15.769			4.513	15.507		
AVG % Female Commanding Officer		4.643	14.505					4.548	13.608
AVG % AA Senior Leadership		7.867	13.065	10.263	14.914				
AVG % Hisp Senior Leadership		6.774	12.116			6.861	11.928		
AVG % Female Senior Leadership		6.149	10.938					6.321	11.297
AA Junior Officer * AVG % AA Commanding Officer		0.813	6.907	8.307	20.658				
Hisp Junior Officer * AVG % Hisp Commanding Officer		0.323	4.299			4.513	15.507		
Female Junior Officer * AVG % Female Commanding Officer		1.139	7.080					4.548	13.608
AA Junior Officer * AVG % AA Senior Leadership		1.009	5.570	10.263	14.914				
Hisp Junior Officer * AVG % Hisp Senior Leadership		0.491	3.642			6.861	11.928		
Female Junior Officer * AVG % Female Senior Leadership		1.581	6.274					6.321	11.297
African American		0.099	0.298	1.000	0.000				
Hispanic		0.072	0.259			1.000	0.000		
Female		0.250	0.433					1.000	0.000

C. ERRORS

There are three specific errors in the data set that must be addressed. These errors are evolved from measurement error. The first measurement error is the absence of the Additional Qualification Designator (AQD) signaling that a specific Naval Officer is or has been the Commanding Officer of a United States Warship. Without this AQD, we used other means to identify the Commanding Officer based on the highest rank on board the specific ship at that time. This introduces further measurement error. This measurement error is a random error and is to be naturally expected in an experiment.

The second measurement error that can be found within our combined data set is the random absence of the variable End of Active Obligated Service (EAOS). This measurement error is derived from bad coding leaving individual Naval Officers with an EAOS of “00000000” instead of an actual date in the form of a four-digit year followed by the two-digit month and then by the two-digit day. While this measurement error is also random and should be naturally expected in an experiment, it is a key variable in identifying whether or not the Junior Naval Officer extended their respective time in the Navy. Those Naval Officers without an accurate EAOS were systematically dropped from the data set, which ultimately dilutes the clarity of same-minority effects.

Finally, the third measurement error in the data set is derived from the variables race and ethnicity. The measurement error in these two variables exists from the Naval Officers who declined to respond when identifying as a specific race or ethnicity. These individuals were systematically dropped from the data set, which also dilutes the clarity of possible same-minority effects between Commanding Officer and Junior Officer. This measurement is random and should also be expected in an experiment.

D. SUMMARY

There is a total of 21 variables defined in the provided data set from DMDC. Chapter IV is comprised of the methodology and results of the two models used for analysis of retention rates within the Surface Warfare community in the United States Navy.

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IV. METHODOLOGY, MODELS, AND RESULTS

A. PURPOSE

This chapter examines the results from the research model. It addresses the controls and errors found in the data. The controls corrected errors that would have otherwise contaminated the models.

B. METHODOLOGY

The research objective is to determine what effect that Minority Naval Commanding Officers have on the retention of Minority Junior Naval Officers. This section provides a description of the models created for the research.

1. Ordinary Least Squared Regression

An Ordinary Least Squared (OLS) Regression model is used to determine if Minority Commanding Officers and Minority Senior Leadership, as described in Chapter III, have a statistically significant influence on a Minority Junior Naval Officer's decision to retain in the Navy. The OLS regression is used to estimate or predict the effects of the outcome or dependent variable. In our specific model, the dependent variable is the rate at which Minority Junior Naval Officers retain in the Navy past their initial EAOS. This simple OLS regression draws from a random sample of the population of Naval Officers to estimate the properties of the population to see if there are any significant factors affecting the retention of Minority Junior Naval Officers. To estimate the parameters for the independent variables, a method of maximum likelihood is used in the statistical software package Stata/IC 13.0. Utilizing this software, parameters are considered to be statistically significant if the regression produces a p-value that is less than 0.05. This model is designed to specifically measure whether the leadership role model effect exists among officers within the United States Navy Surface Warfare community.

2. Difference-in-Difference Regression

In 2017, Dylan Glover et al. published a study in *The Quarterly Journal of Economics* examining the performance of the cashiers in a French grocery store chain. The

study examined how the cashiers worked with different managers on different days, revealing that when minority cashiers worked with managers who had a greater bias toward minorities, the minority cashiers were absent more often, spent less time at work, scanned items more slowly, and took more time between customers, resulting in reduced efficiency (Glover et al., 2017). The study goes on to explain that the biased managers interact less with their minority cashiers, resulting in the managers exerting less effort in comparison to non-biased managers, who see the minority and non-minority cashiers' performances as average if not above average (Glover et al., 2017). The findings from this study are on par with statistical discriminatory hiring where minorities underperform for biased managers resulting in "higher hiring standards for minorities to get similar average performance from minority and non-minority workers" (Glover et al., 2017).

While this study provides a valid finding, the purpose of dissecting this study is to develop the model that was used and apply it to our study. The model utilized in this study is a difference-in-difference model with the purpose of "comparing the change in minority worker's performance under more and less biased managers to the change in nonminority performance" (Glover et al., 2017). This effect allows for the possibility that all of the workers were observed under biased managers. This framework will be replicated in our study to compare the effects of Minority Senior Leadership and Minority Commanding Officers on the retention rates of Junior Naval Officers.

C. MODELS

To measure the role model effects in relation to retention between Minority Junior Naval Officers and their respective Minority Commanding Officers as well as the retention effects of Minority Senior Leadership we created two models. The data initially received from DMDC was divided into two files. The first, Analysis file, that contained Junior Naval Officers from 1995–2018. The second was the Leadership file containing the Senior Naval Officers of the rank Lieutenant Commander (O4), Commander (O5), and Captain (O6). The Leadership file identifies Commanding Officers from each respective UIC at any given year and month can be extracted. After identifying the key roles of Junior Naval Officer, Commanding Officer, and Senior Leadership Officers, we then merged the two files based

on the UIC and year and month timing. After doing this, we were then able to determine the percentages of time served during a Junior Officer's tour under a Minority Commanding Officer as well as the average representation of Minority Senior Leadership. The outline of the equations for both models can be seen in Table 3.

1. Role Models Commanding Officer Model

The first model is an analysis of the role model effect pertaining to Minority Commanding Officers as well as Minority Senior Leadership and the Minority Junior Officers serving under their command. The base regression model is for the three main minorities being studied, African American, Female, and Hispanic. One example of the models with the African American minority being utilized as an example in Table 3. The other two models for Female and Hispanic are identical in design, while substituting the respective variables of percentage of time under a Minority Commanding Officer and average percentage of Minority Senior Leadership to the appropriate demographic being analyzed.

Table 3. Minority Commanding Officer's OLS Regression Models

Model Label	Regression Equation
Dependent Variable	Retention Decision
Sample	All African American Junior Officers serving on UICs within data set
Explanatory Variables	X1 - Percentage of Time Under Commanding Officer (African American) X2 - Average Percent of Minority Senior Leadership (African American) UIC Year/Month

2. Difference-in-Difference Senior Leadership Model

After constructing the Minority Naval Commanding Officer model, we constructed the model to measure the effect on a Minority Junior Officer's retention decision based on the interaction with Senior Officers at their respective UIC during their tour in comparison to their non-minority counterparts. To measure this, we created a model utilizing the same Minority Junior Officers at each command and then measured their retention against their interaction with same-Minority Officers at the respective command with the ranks of Lieutenant Commander (O4), Commander (O5), and Captain (O6). This difference-in-difference regression model was utilized for the three main minorities being studied, African American, Female, and Hispanic. An example with the African American minority model is shown in Table 4 as an example. The other two models for Female and Hispanic are identical in design, while substituting the respective roles and percentage of Senior Leadership to the appropriate demographic being analyzed.

Table 4. Difference-in-Difference Minority Senior Leadership's OLS Regression Models

Model Label	Regression Equation
Dependent Variable	Retention Decision
Sample	All Junior Officers serving on UICs within data set
Explanatory Variables	X1 - Percentage of Time Under Commanding Officer (African American) X2 - Average Percent of Minority Senior Leadership (African American) X3 - African American Officer X1*X3 X2*X3 UIC Year/Month

D. RESULTS

The results for minority retention effects for African Americans, Females, and Hispanics from the two models discussed in Tables 3 and 4 can be examined in Tables 5, 6, and 7. Their analysis identified three respective effects.

1. African American Retention Effect Results

Table 5 provides the results for the role model effect of an African American Commanding Officer as well as the role model effect of African American Senior Leadership (O4–O6) on the observed African American Junior Officer retention rate. Also included in Table 5 is the estimated difference-in-difference effect on African American Junior Officer retention under the influence of African American Senior Leadership (O4–O6).

A one percentage point increase in the percentage of African American Senior Leadership (O4–O6) yields an estimated 0.007 decrease in the likelihood of retention. This result is statistically significant based on a p-value less than 0.05. The role model effect for an African American Junior Officer serving under an African American Commanding Officer was not statistically significant. These results are counterintuitive to common belief, especially when studying the predominately positive role model effects from the studies in the earlier chapters of this thesis.

In the difference-in-difference model, an African American Junior Officer serving under African American Senior Leadership (O4–O6) does not retain at a detectable difference in comparison to the rest of the Junior Naval Officers as a whole. An African American Junior Officer serving under an African American Commanding Officer does not retain at a detectable difference compared to the rest of the Junior Naval Officers as a whole. Furthermore, an African American Junior Officer in the United States Navy Surface Warfare community retains at an estimated lower rate compared to non-African American Junior Officers. This result is not statistically significant.

Table 5. African American Effects on African American Junior Naval Officer's Retention Results

VARIABLES	MODEL 1 RETENTION	MODEL 2 RETENTION
Percent African American O4-O6 Officers	-0.007** (0.003)	0.002 (0.001)
Percent African American Commanding Officer	0.003 (0.002)	0.001 (0.001)
African American Junior Officer		-0.021 (0.030)
African American Junior Officer*Percent African American O4-O6 Officers		-0.003 (0.002)
African American Junior Officer*Percent African American Commanding Officer		0.002 (0.002)
Observations	231	2,360
R-squared	0.420	0.114
UIC FE	YES	YES
FY FE	YES	YES
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1		

2. Female Retention Effect Results

The results for the role model effect of a Female American Commanding Officer as well as the role model effect of Female Senior Leadership (O4–O6) on the observed Female Junior Officer retention rate. Also included in Table 6 is the difference-in-difference effect on Female Junior Officer retention.

The role model effect for Female Junior Officers yields no detectable difference when serving under Female Senior Leadership (O4–O6). The role model effect for a Female Junior Officer serving under a Female Commanding Officer yields no detectable difference in retention rate.

In the difference-in-difference model, a Female Junior Officer in the United States Navy Surface Warfare community serving under Female Senior Leadership (O4–O6) yields no detectable difference in retention in comparison to the rest of the Junior Naval Officers as a whole. A Female Junior Officer serving under a Female Commanding Officer yields no detectable difference in retention rate compared to the rest of the Junior Naval

Officers as a whole. A Female Junior Officer in the United States Navy Surface Warfare community retains at an estimated lower rate compared to Male Junior Officers. This result is not statistically significant.

Table 6. Female Effects on Female Junior Naval Officer's Retention Results

VARIABLES	MODEL 1 RETENTION	MODEL 2 RETENTION
Percent Female O4-O6 Officers	-0.000 (0.002)	0.003*** (0.001)
Percent Female Commanding Officer	-0.000 (0.002)	0.002 (0.001)
Female Junior Officer		-0.024 (0.020)
Female Junior Officer*Percent Female O4-O6 Officers		-0.003 (0.002)
Female Junior Officer*Percent Female Commanding Officer		0.000 (0.002)
R-squared	0.224	0.117
UIC FE	YES	YES
FY FE	YES	YES
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1		

3. Hispanic Retention Effect Results

The results for the role model effect of a Hispanic Commanding Officer as well as the role model effect of Hispanic Senior Leadership (O4–O6) on the observed Hispanic Junior Officer retention rate are shown in Table 7. Also included in Table 7 the difference-in-difference effect on Hispanic Junior Officer retention.

The role model effect for Hispanic Junior Officers produces no detectable difference in retention based on a one percentage point increase in Hispanic Senior Leadership (O4–O6). There is no difference in retention in the role model effect for a Hispanic Junior Officer serving under a Hispanic Commanding Officer.

In the difference-in-difference model, there is no detectable difference in retention for a Hispanic Junior Officer in the United States Navy Surface Warfare community in comparison to the rest of the Junior Naval Officers as a whole. A Hispanic Junior Officer serving under a Hispanic Commanding Officer produces no detectable difference in retention rate compared to the rest of the Junior Naval Officers as a whole. Furthermore, a Hispanic Junior Officer in the United States Navy Surface Warfare community retains at an estimated lower rate compared to non-Hispanic American Junior Officers. This result is not statistically significant.

Table 7. Hispanic Effects on Hispanic Junior Naval Officer's Retention Results

VARIABLES	MODEL 1 RETENTION	MODEL 2 RETENTION
Percent Hispanic O4-O6 Officers	-0.001 (0.005)	0.000 (0.001)
Percent Hispanic Commanding Officer	0.001 (0.004)	0.000 (0.002)
Hispanic Junior Officer		-0.011 (0.033)
Hispanic Junior Officer*Percent Hispanic O4-O6 Officers		0.002 (0.003)
Hispanic Junior Officer*Percent Hispanic Commanding Officer		-0.002 (0.002)
R-squared	0.566	0.112
UIC FE	YES	YES
FY FE	YES	YES
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1		

E. SUMMARY

The models identified show both the Minority Commanding Officer role model effect and the Minority Senior Leadership difference-in-difference effect to have a negligible effect on the retention of Minority Junior Officers serving in the United States

Navy Surface Warfare community. The modeling identified 21 different results, with only one of the 21 results yielding any statistical significance. The statistically significant result was from the African American Senior Leadership effect which yielded a surprisingly estimated negative 0.007 effect on the retention rate of African American Junior Officers in the United States Surface Warfare community between the years of 1995 and 2018.

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V. SUMMARY, CONCLUSION, AND RECOMMENDATIONS

A. SUMMARY

Recruiting the nation's best and brightest men and women remains essential to the continued success of the United States Navy, and their mission readiness. The art of retaining the nation's best and brightest though might just be as or more important when considering the amount of training expended on these individuals. The United States Navy must gain a better understanding of better methods for retaining their most valuable asset, their people. This study examines a small portion of the retainment puzzle as it focuses on the effects that Minority Commanding Officers and Minority Senior Leadership have on the retention of Minority Junior Officers serving in the United States Navy Surface Warfare community. The examination of this can be used to better predict retention within the community which can be used for forecasting numbers and recruiting practices.

B. CONCLUSION AND RECOMMENDATIONS

Utilizing the role model effect model (Kofoed & McGovney, 2017) and the difference-in-difference model (Glover et al., 2017), we analyzed the effects that Minority Commanding Officers and Minority Senior Leadership have on the retention of Minority Junior Naval Officers in an attempt to answer the following two questions:

1. Do Minority Commanding Officers have an effect on the retention of Minority Junior Officers in the Navy?
2. Do Minority Senior Officers have an effect on the retention of Minority Junior Officers in the Navy?

This analysis is important because having an accurate understanding of how minority relationships affect retention rates in the United States Navy Surface Warfare community can lead to more effective ways to retain the talent within as well as possibly changing recruiting practices in the long run. The results of this analysis do not indicate an overall statistically significant effect between minority leadership and the retention of Minority Junior Naval Officers. These results indicate that there is no relationship existing

in the data sample between Minority Junior Naval Officers and their superiors serving at the same UIC. This is surprising as we expected entering the study that same demographic leadership would yield an effect on their junior subordinates' decisions to retain. We were unsure during the hypothesis phase as to whether or not those effects would yield positively or negatively on the retention decision. In regard to actionable items, we urge the offices of Chief of Naval Personnel–N1D–Office of Inclusion and Diversity and the Bureau Naval Personnel/Naval Personnel Command–00BE–Office of EEO and Diversity Services to obtain data that offers better clarity into the descriptive variables for each Naval Officer in the Surface Warfare community.

We feel that this study served its purpose of understanding the effect of minority role model effects on the talent retention within the Minority Junior Naval Officer ranks. The United States Navy should take away that there is not a statistically significant effect overall when constructing new or reengineering current policies pertaining to an increase of how many Minority Naval Officers rise to leadership positions within the Surface Warfare community. The analysis also indicates that due to the results there should be no change in this regard to the efforts for Navy Recruiting Command.

C. FUTURE RESEARCH

To improve this study in the future, the main change would be to obtain data that contains accurate depiction of each Naval Officer's Additional Qualification Designator (AQD) as well as their accurate End of Active Obligate Service (EAOS). These two variables are crucial to the study in both identifying the key roles such as the Commanding Officer of each Naval warship as well as any shifts to EAOS which indicates retention. The data set received from The Defense Manpower Data Center (DMDC) did not accurately have this information causing a deterioration in our models and their respective computing power. If DMDC is incapable of accurately providing this information, future researchers should explore obtaining data sets containing the information directly from the specific Naval community they are researching.

Future research opportunities include but are not limited to:

- Reexamining the United States Navy Surface Warfare community under the premise of obtaining a new data set or an improved data set based on accurate EAOS/AQD variables.
- Expansion of the data set to include all UICs within the Navy Surface fleet, not just the ones selected for this study.
- Examining other warfare communities such as aviation, subsurface, the supply corps, or SEAL communities utilizing the same role model effect and difference-in-difference models constructed in this thesis.
- Examining the current data set using other key variables such as UIC, UIC location, or outside variables such as economic environment both nationally and within the servicemembers home of record.

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